Landfill Postclosure Land Use Symposium

Case Studies: Legal and Economic Issues

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Postclosure Land Use – Case Studies

- Arizona Street Landfill:
  The Importance of Postclosure Land Use Approvals
- Journey to Atlantis:
  A Mission Bay Landfill Postclosure Project

Where Do You Start?
Authority

- Title 27, California Code of Regulations §21100 (b)(2) Scope and Applicability
- Title 27, California Code of Regulations §21100 (d)
- Title 27, California Code of Regulations §21190(c) Postclosure Land Use

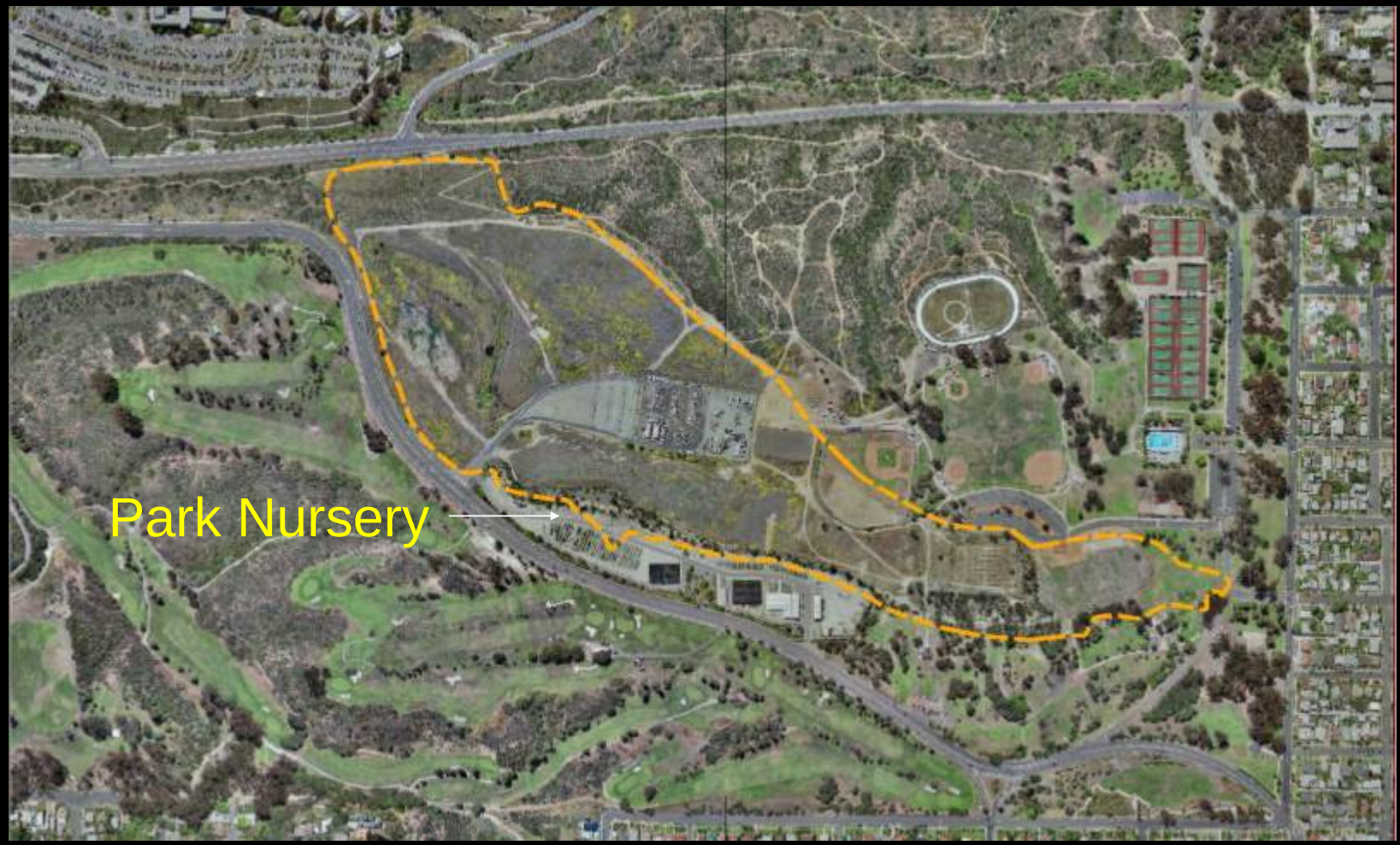
Key Elements of Review

- Impacts of Landfill Gas
- Integrity of Cover Soils
- Drainage (Runoff and Run on)
- Community Health and Safety Plan
- Postclosure Maintenance Plan

Arizona Street Landfill:
The Importance of Postclosure Land Use Approvals

- Total Acreage: 139 Acres
- Waste Footprint: 64 Acres
- Operated: 1952 to 1974
- Waste Volume in place: 1,938,000 tons
  90% Residential
  10% Demolition
- Canyon Fill
- Operated by: City of San Diego
- Current Land Use: Public Park

Arizona Landfill



Proposed Postclosure Land Use Project: Park and Recreation Department Nursery 1987

- Preparation of nursery area required:
  - Mass grading to eliminate differential settlement and to raise project elevation
  - The extension of an existing storm drain that ran through the landfill

Mass Grading - 1987

Existing Storm Drain Inlet - 1987

Existing Storm Drain Inlet - 1987

May 1, 1987

The existing storm drain inlet was covered with plywood to prevent soils associated with grading from infiltrating the storm drain.

Laborer removed the plywood and commented while pinching his nose, “Boy, that really stinks!”

He then took a break, and lit a cigarette.

Consequences

- Laborer was blown six feet from storm drain
- Clothes caught fire
- Sustained burns over 35% of body
- Backhoe operator sustained flash burns

Severe burns to hands
(Approximately 3 years later)

Numerous Skin Grafts Required
Donor sites: Thighs & Abdomen
(Approximately 3 years later)

Project Deficiencies

- Proposed postclosure land use had no agency approvals (Other than city ministerial engineering approvals)
- No landfill gas monitoring
- No Community Health and Safety Plan
- No disclosure of the potential presence of landfill gas

Consequences

- Out of Court Settlement of $915,350
- Redesign of Storm Drain
- Installation of Landfill Gas Collection System 1990-1991
  - Flare
  - 23 extraction wells
- OSHA issued the City of San Diego a Violation Citation

Update

- Landfill Collection and Perimeter Monitoring System
  - Larger flare
  - 54 Extraction wells
  - Perimeter migration probes

- All proposed postclosure land use projects, on or within 1,000 feet of the landfill, are required to be reviewed and approved by the LEA

- The LEA conducts outreach to City Departments to ensure proposed projects are routed to LEA

Journey to Atlantis:
A Mission Bay Landfill Postclosure Project

Mission Bay Landfill

- Total Acreage: 115 Acres (former wetlands)
- Operated: 1952 to 1959
- Waste Composition:
  Residential, Demolition, Industrial
  (Metals, Solvents, Industrial Process Residues)
- Trench Fill
- Hydraulic Fill, from dredging of Mission Bay (1959-1969)
- Operated by: City of San Diego
- Current Land Use: Public Park

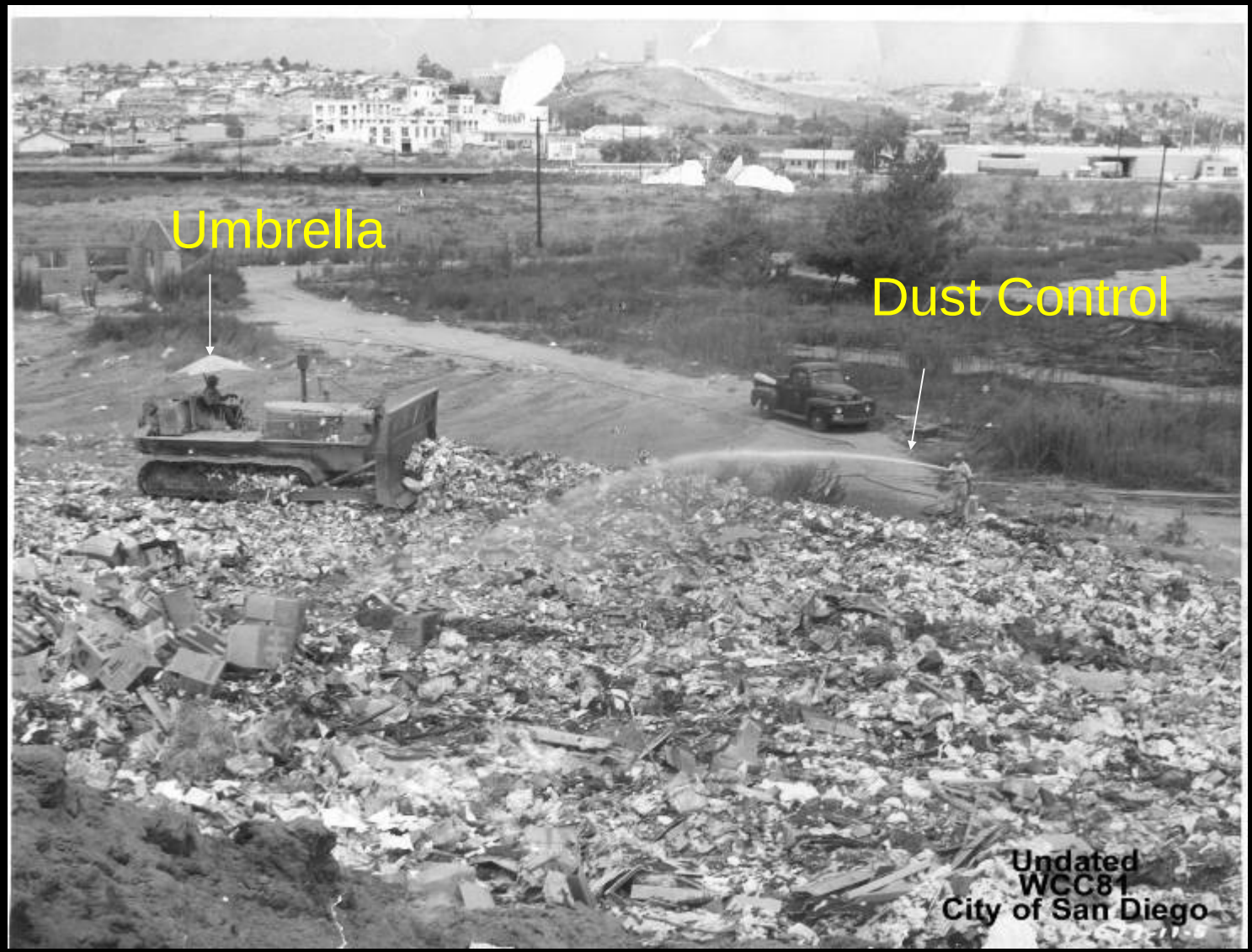
Mission Bay Landfill

Mission Bay Landfill Prior to Disposal Activities - 1952

Mission Bay Landfill Opening Day – July 24, 1952

Mission Bay Landfill - Trench Fill

Nuisance Control and Health and Safety even in the ’50s



SeaWorld

- Marine Education and Entertainment Park
- Property is leased from City of San Diego (1961, park opened to public 1964)
- Portion of parking lot is over Mission Bay Landfill
- Attracts approximately 4 million visitors per year


10-12-61
SeaWorld
Lease
Landfill
10-12-1961
WCC75
City of San Diego

SeaWorld Master Plan

- Approved by San Diego City Council and California Coastal Commission 2002
- 4 Major Projects
  (Including Journey to Atlantis)

Journey to Atlantis (JTA)

- Constitutes a Postclosure Land Use Project
- Proximity to Mission Bay Landfill
  - 800 feet
  - utility upgrades

Landfill Gas

- Lack of Data

- LEA required a Soil Gas Survey be conducted
  - 28 Temporary Soil Vapor Probes installed
  - Depths of Installation: 5 feet and 15 feet (if possible)
  - Field Analysis (Landtec and Flame Ionization Detector) and Laboratory Analysis

Results of Soil Gas Survey

- Methane ranged from 0.43% to 21.6%
  (Laboratory and Field Analytical Results Consistent)
- Ethane Concentrations ranged from non-detect – 14.4 ppmv
- Hydrogen Sulfide ranged from non-detect to 1820 ppmv
- No individual VOCs were detected in individual analysis
- Highest levels observed closest to the landfill footprint

Documents Required by the LEA

- Landfill Gas Soil Survey
- Work Plan (Project Description & Construction Documents)
- Construction and Community Health and Safety Plans
- Postclosure Maintenance Plan
  - Landfill Gas Monitoring Program

Work Plan

- Track-guided rollercoaster
  (95-foot tall vertical lift tower)
- Two artificial lakes
- Support structures
  Maintenance, Technical, Control, Storage
- Water treatment facilities
- Storm water pump station
- 12-kilovolt ampere electrical line extension

Landfill Gas Design Related Considerations

- Limited concentrations and extent of methane detected during soil gas survey
- Soil Compaction required for JTA ride exhibits a lower porosity than surrounding soils
- Foundation structures constructed of high-compression strength concrete
- Buildings with sub-grades and enclosed portion of JTA ride had active exhaust fans

Landfill Gas Related Components

- Installation of three landfill gas migration probes
- Hard wired methane detectors in enclosed buildings
- Installation of trench dam through SDG&E utility trench (12-KvA line)
- Implementation of a landfill gas monitoring and reporting program that included monitoring of other structures, including storm transfer pump stations and electrical pull boxes, with field instruments

Landfill Gas Migration Probes

Hard Wired Methane Detectors

Journey to Atlantis Facts

- Years in the making
- Ground Breaking
  November 2002
- Grand Opening Memorial
  Weekend 2004
- Construction 18 months
- Approximate Cost
  $32 Million
- 130,000 Gallon Tank
- 5 Commerson Dolphins

Journey to Atlantis - Landfill Costs

- $100,000
  Environmental Investigations
  & Design Components
- $100,000
  Community Outreach
  - Attempts to stop project
  - Revocation of California
  Coastal Permit (Denied)
- $15,000
  Annual Environmental
  Monitoring (Landfill
  Gas & Groundwater)

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Authority

Title 27, California Code of Regulations
§21100 (d):

“Closed sites for which closure plans were not approved pursuant to §20164 or §21099, and illegal or abandoned disposal sites which pose a threat to public health and safety or the environmental shall implement the provisions of these regulations as required by the LEA”

Authority

Title 27, California Code of Regulations
§21100 (b)(2):

“New postclosure activities that may jeopardize the integrity of previously closed disposal sites or pose a potential threat to public health and safety or the environment”

Authority

Title 27, California Code of Regulations §21190(c):

"All proposed postclosure land uses, other than non-irrigated or on closed sites shall be submitted to the EA, RWQCB, local air district and local land use agency. The EA shall review and approve proposed postclosure land uses if the project involves structures within 1,000 feet of the disposal area, structures on top of waste, modification of the low permeability layer, or irrigation over waste"

Authority (1978-1989)

Title 14, California Code of Regulations §17734:

"Prior to the construction of improvement on completed sites, such projects must be submitted to the enforcement agency for review and comment concerning possible construction problems, hazards to health and safety, and factors which might affect the improvements."